AUSTIN INDEPENDENT SCHOOL DISTRICT
Department of Program Evaluation

The state of Texas mandates that districts with at least 15 or more eligible 4-year-old students provide a half-day prekindergarten (pre-K) program to prepare students developmentally for the rigors of kindergarten and beyond. In 2010–2011, Austin Independent School District (AISD) provided eligible students with full-day pre-K across 68 elementary campuses and the Lucy Read Prekindergarten Demonstration School. This report evaluates student achievement in the AISD pre-K program during the 2010–2011 school year, based on (a) Peabody Picture Vocabulary Test-IV (PPVT-IV) and Test de Vocabularío en Imagenes Peabody (TVIP), (b) academic progress on the Prekindergarten Report to Parents, and(c) teacher evaluations of students' social and developmental skills.

KEY FINDINGS

The major findings of this report includes the following:

> More than a third of entering AISD pre-K students (37%) were at least one standard deviation below the national average in receptive vocabulary ability in Fall 2010.

- The median equivalent age of pre-K students' receptive vocabulary in their native language, as measured by the PPVT-IV and TVIP in Fall 2010, was 9 months below the median actual age (N = 867).
- The average normal curve equivalent (NCE) score for the PPVT-IV and TVIP in Fall 2010 was 36.5 (i.e., 13.5 points below average).

> In general, the AISD pre-K program advanced students' ability in receptive vocabulary in their native language to the national average by the end of the school year.

- Among the English-speaking pre-K students tested (n = 373), 91% scored in the average range or higher in Spring 2011 on PPVT-IV; 21% advanced to the average range or higher from pre- to posttest.
- Among the Spanish-speaking pre-K English language learners (ELLs) tested (n = 488), 87% scored in the average range or higher in Spring 2011 on the TVIP; 31% advanced to the average range or higher from pre- to post-test.
- In Spring 2011, the median age equivalent score was 1 month above the median actual age of students tested.

PRE-K PROGRAM DESCRIPTION

AISD provides a full-day pre-K program for all children who are 4-years-old on or before September 1st of the current school year and who meet one of the following eligibility criteria:

- Economically disadvantaged (qualify for free or reduced-price lunch program)
- ELL
- Homeless
- Child of an active-duty military member or a military member who was injured or killed in service
- Resides or has ever resided in foster care
(Texas Education Code §29.153, [b])

The AISD pre-K program is designed to provide instructional activities to meet the individual needs of young children and stimulate learning in all areas of physical, social, emotional, and cognitive development.

The district pre-K curriculum is closely tied to the guidelines issued by the state of Texas and focuses on the content areas of language and literacy, mathematics (math), social studies, science, technology, health, visual arts, music, and physical education, to prepare students for success in kindergarten.

The program's daily schedule also includes lunch, time for outside play, and time for rest. Students are provided ample opportunities for self-expression and divergent thinking through working individually as well as in large and small groups.

Prekindergarten Student Performance, 2010–2011

> In general, the AISD pre-K program accelerated pre-K students' growth in receptive vocabulary to nearly twice that of the national average expected growth.

- Sampled Spanish-speaking students gained the equivalent of 16 months of growth in equivalent age in a 7-month period, on average.
- English-speaking students gained the equivalent of 13 months of growth in equivalent age in a 7-month period, on average.

> Based on end-of-year report cards, 65% of students were, on average, on grade level across all core pre-K academic areas, and 70% met expectations across all personal development areas.

- In the content areas of pre-reading, math, writing, and social studies/science/health, more than 80% of pre-K students were "on grade level," as reported by their teachers on their report cards at the end of the year.

PRE-LITERACY SKILLS

The first 5 years of a child's life are influential in his or her later school and life success (National Research Council, 2001). Decades of research indicate that early exposure to high-quality educational opportunities benefit young children by preparing them for when they enter school. Students' early language skills lay the foundation for later reading and writing in school, and students with poorer language skills are more likely to have difficulties learning to read than are students with good language skills (Whitehurst & Lonigan, 1998). Studies have shown that students who have difficulty learning to read in the earliest years of schooling tend to continue having difficulties over time (Scarborough, 2001; Snow, Burns, & Griffin, 1998). Vocabulary recognition is a precursor to the development of reading skills.

The PPVT-IV and the TVIP measure knowledge of receptive vocabulary in English and Spanish, respectively (Dunn & Dunn, 2007). Receptive (i.e., hearing) vocabulary is one domain of language development. In previous years, pre-K students were assessed in AISD using the PPVT-III (1981). In 2010–2011, AISD used the PPVT-IV (2007) to assess students. The fourth edition was re-normed and included updated pictures, a larger viewing plane, and pictures in color. The TVIP (i.e., the Spanish version of the assessment) was not updated; the assessment publisher has discussed plans to replace the TVIP with the PPVT-IV, Spanish version, in 2012. Pre-

PPVT-IV AND TVIP INTERPRETATION

The standard scores for the PPVT and TVIP are based on age norms from samples of native speakers in English and Spanish, respectively. The tests are best interpreted in the native language of the student.

The mean student standard score is 100, with a standard deviation of 15 points. For the national samples on which the scores are based, the majority of students (68%) scored between 85 and 115. Scores less than 70 are *extremely low*, scores ranging from 70 to 84 are *moderately low*, scores ranging from 85 to 99 are *average low*, scores ranging from 100 to 115 are *average high*, and scores higher than 115 are *above average*.

Because these tests are age normed, a student must have a raw score about 8 to 10 points higher in the spring to receive the same standard score as in the fall. Generally, a gain greater than 4 points indicates a significant improvement in performance.

An age-equivalent score converts a student's raw score to an age reference group in which that raw score represents the median. The age-equivalent score accounts for the rate of receptive vocabulary growth, providing an expected growth rate with which to compare students' performance.

Interpretation of Normal Curve Equivalent (NCE) Scores

Range of performance	NCE scores	National percentile
Very low	1 – 24	1 – 11
Low	25 – 35	12 – 25
Low average	36 – 44	26 – 39
Average	45 – 55	40 – 60
High average	56 – 64	61 – 74
High	65 – 75	75 – 88
Very high	76 – 99	89 – 99

Source. Southard, 2006

and post-assessments were administered by the Department of Program Evaluation (DPE) to a random sample of pre-K classes in the fall and spring of the 2010–2011academic year. At least one class was chosen from each of the 69 campuses that offer pre-K; 8 classrooms were chosen from Lucy Read. All students in the sample were tested in English (PPVT-IV), and Spanish-speaking ELLs were tested in Spanish (TVIP), as well. A total of 1,004 students were tested in both semesters, representing nearly 18% of all students enrolled in the pre-K program. Of the students tested, 37% were English-speakers (*n* = 373), 54% were Spanish-speaking ELLs (*n* = 539), 9% were other ELLs (*n* = 92), and 10% (*n* = 104) were students at Lucy Read.
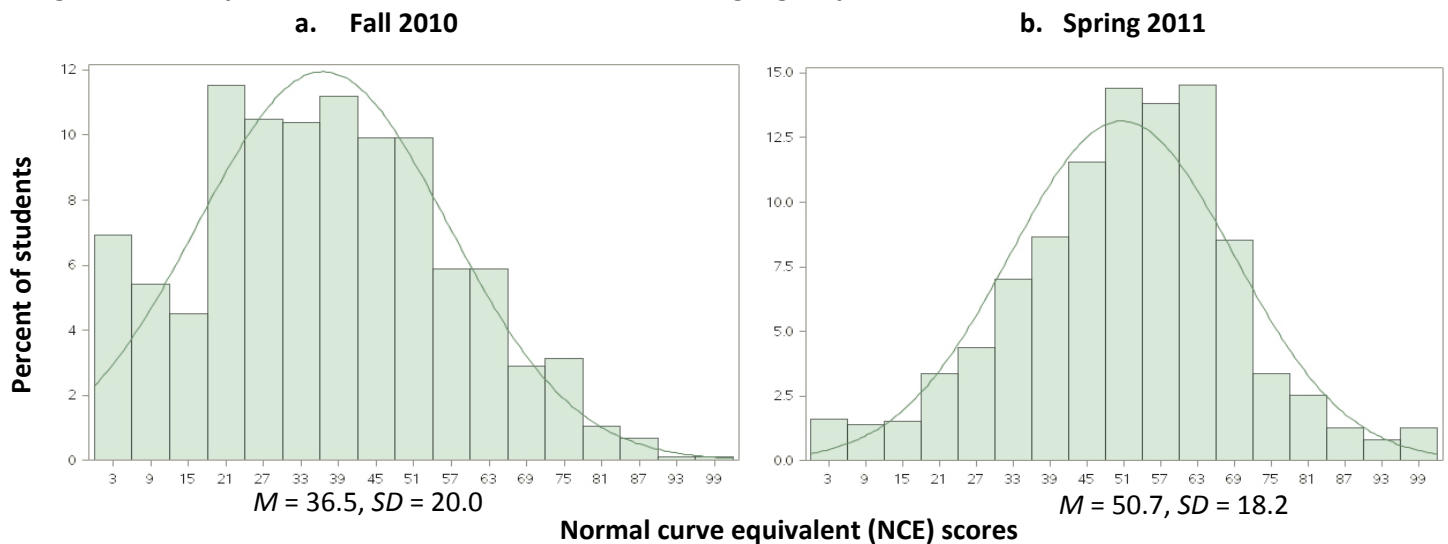
AISD Pre-K Advances Students to the National Average in Receptive Vocabulary

Pre-K programs are designed to prepare students for kindergarten who might otherwise not have access to early educational programs. A quality pre-K program contributes to the reduction of the achievement gap in school performance that students face due to socio-economic and language barriers. The goal of AISD pre-K is to raise students' academic performance to the average range of their peers. The

assumption is that students who advance to at least the average range in the test of their language of instruction will be ready for future literacy learning in kindergarten.

As mentioned in the section entitled "PPVT-IV and TVIP Interpretation," scores are best interpreted in the students' native language. For the PPVT, students are compared with a national sample of native English speakers. For the TVIP, students are compared with a national sample of native Spanish speakers. To make group comparisons and estimates of students' gains and losses, standardized scale scores were converted into NCE scores. NCE scores have a mean of 50 and a standard deviation of 21.06 points (i.e., the national normal distribution of scores). When interpreting NCE average gain (or loss), note that a zero shows that the students' growth did not differ from the national average expected growth; a zero does not indicate "no growth". Deviations of ±4 represent a significant growth (or loss), compared with national expected growth, and deviations of ±11 represent a very high significant gain (or loss). In Fall 2010, AISD pre-K students, on average, had a NCE score of 36.5 in their native language (Figure 1a).

Figure 1. Prekindergarten Students' Peabody Picture Vocabulary Test (PPVT- IV) and Test de Vocabularío en Imagenes Peabody (TVIP) Performance Scores in Native Language, by Semester, 2010–2011 (*N* = 867)

| a.   Fall 2010 | b.   Spring 2011 |

M = 36.5, *SD* = 20.0   *M* = 50.7, *SD* = 18.2

Normal curve equivalent (NCE) scores

Source. AISD student records, Department of Program Evaluation

In Fall 2010, the distribution of pre-K students' PPVT and TVIP scores in their native language showed 73% of entering AISD pre-K students (rather than an expected 50%) had scores below the national mean score; 37% were at least one standard deviation below average. The median equivalent age of pre-K students' native language receptive vocabulary ability was 9 months below the median actual age (*N* = 867). In Spring 2011, the distribution of the PPVT and TVIP scores more closely approximated the national distribution (Figure 1b); 43% of sampled pre-K students had scores below the national mean in their native language, and 11% were at least one standard deviation below average. The median age equivalent score was 1 month above the median actual age.

> 89% of sampled pre-K students scored in the average range or better in receptive vocabulary in Spring 2011 in their native language.

PPVT AND TVIP BY ELL STATUS

The average PPVT-IV NCE score for English-speaking students in Fall 2010 was 39.0, while the average pre-test score for Spanish-speaking ELLs was 34.5. In Spring 2011, the average NCE score for English-speaking pre-K students was 50.2, with an average gain of 11.2 NCE. For Spanish-speaking ELLs, the posttest scores averaged 51.1, with an average gain of 16.6 NCE.

The AISD pre-K program advanced students' distribution of scores. Ninety-one percent of sampled English-speaking students scored in the average range or higher, and 87% of sampled Spanish-speaking students scored in the average range or higher (Figure 2). Approximately 84% of students were expected to be in the average range or higher in the standard normal distribution in which the scores were based. From pre-test to posttest, a 21 percentage-point growth occurred among English-speaking students who advanced to the average range or higher. A 31 percentage-point growth occurred for Spanish-speaking students who advanced to the average range or higher. More than half of sampled native English-speaking students (53%) and Spanish-speaking students (61%) scored *average-high* or *above average* on the PPVT/TVIP in Spring 2011.

Figure 2. Students' Peabody Picture Vocabulary Test (PPVT-IV) and Test de Vocabularío en Imagenes Peabody (TVIP) Performance, by Native Language, by Semester, 2010–2011 (*N* = 867)
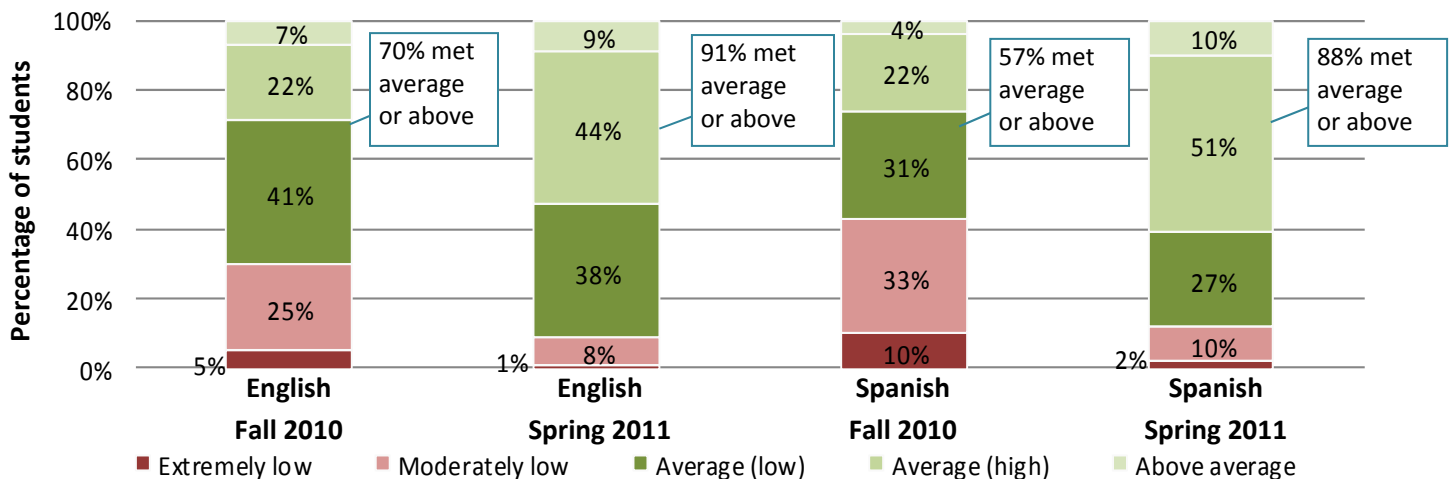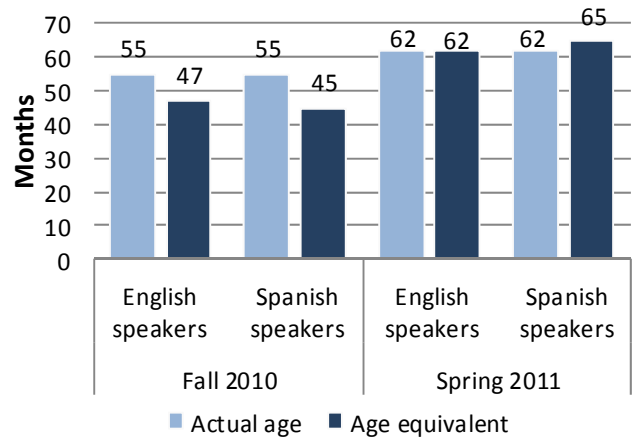

Source. AISD student records, Department of Program Evaluation

### ENGLISH LANGUAGE LEARNER STATUS, CON'T.

In general, sampled English-speaking students came into the AISD pre-K program with slightly greater ability in receptive vocabulary in their native language than did Spanish-speaking students; however, both groups of students had median age equivalency scores that were well below the median actual age during the time of testing (Figure 3). That is, half of sampled English-speaking pre-K students were 8 months or more below their expected ability level in Fall 2010, while half of sampled Spanish-speaking students were 10 months or more below the expected ability level in their native language.

However, by Spring 2011, both groups showed improvement. Most English-speaking students were performing at their actual age level, gaining the equivalent of 13 months in ability in a 7-month period (nearly twice the expected growth). Approximately 75% (n = 281) of sampled English-speaking students improved their age equivalency score by more than 7 months (i.e., faster than the expected growth rate in receptive vocabulary). In addition, on average, Spanish-speaking students gained the equivalent of 16 months in ability level (i.e., a little more than 2 times the expected growth). Approximately 79% (n = 387) of sampled Spanish-speaking students improved their age equivalency score by more than 7 months. A more complex data analysis[1] confirmed that ELLs gained slightly more in NCEs than did non-ELLs.

Figure 3. Median Age Equivalent Scores in Months, by Native Language, 2010–2011

Source. AISD student records, Department of Program Evaluation
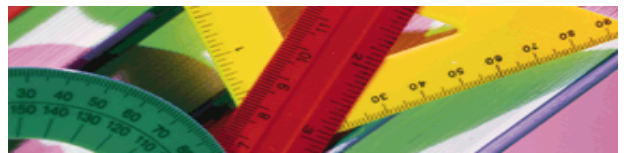
In a 7-month period, pre-K students gained the equivalent of 13 to 16 months of growth in receptive vocabulary, on average.

COGNITIVE DEVELOPMENT

The AISD Pre-K Report Card Assessment Rubrics were designed to provide consistency in scoring students' academic progress on the Prekindergarten Report to Parents each 9-week period in listening, math, oral language, social studies/science/health, writing, pre-reading/concepts of print, English as a second language (ESL), and personal development.

Academic performance was rated with the following scale: 1 = *needs improvement*, 2 = *basic understanding*, 3 = *skilled*, and, 4 = *advanced*. A rating of 3 or 4 was defined as being on grade level. The skills evaluated each 9-week period became progressively more rigorous. Report card data for all reporting periods of 2010–2011 are presented in Table 1.

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[1] DPE staff used hierarchical linear modeling (HLM).

Table 1. Prekindergarten (Pre-K) Students on Grade Level, by Content Area and 9-Week Period, 2010–2011

Content area	Percentage of pre-K students on grade level		Change 1st to 4th 9 weeks
	1st 9 weeks	4th 9 weeks	
Oral language	67	77	**+10**
	(*n* = 4,384)	(*n* = 5,049)	
Listening	60	78	**+18**
	(*n* = 4,374)	(*n* = 5,049)	
Pre-reading/concepts of print	60	81	**+21**
	(*n* = 4,395)	(*n* = 5,047)	
Writing	62	84	**+22**
	(*n* = 4,367)	(*n* = 5,047)	
Mathematics	60	87	**+27**
	(*n* = 4,384)	(*n* = 5,048)	
Social studies/science/health	55	88	**+33**
	(*n* = 4,379)	(*n* = 5,048)	
English as second language (ESL)	25	63	**+38**
	(*n* = 2,380)	(*n* = 2,833)	
Average number of areas each student was on grade level	3.6	5.0	**1.4**

Source. AISD student records

Note. The average number of areas each student was on grade level excluded ESL.

Similar to performance in 2009–2010, the content areas with the highest percentage of pre-K students on grade level at the end of the year were social studies/science/health (88%), math (87%), and writing (84%). The greatest growth from the first to fourth 9-week grading period was in ESL (+38%); however, it remained the lowest area to have students on grade level (63%). Sixty-five percent of students were on grade level in all six of the core content areas evaluated in the last reporting period[2] compared with 30% of pre-K students in the first reporting period.

SOCIAL AND PERSONAL DEVELOPMENT

The AISD pre-K program is aimed at developing the whole student, including social and personal development skills. Teachers rate how often students exhibit a variety of traits using the following scores: 1 = *rarely,* 2 = *occasionally*, 3 = *frequentl*y, and, 4 = *consistently*. As with academic performance, a score of 3 or 4 indicates meeting expectations. Table 2 presents the percentage of pre-K students meeting expectations for student behavior for the 14 personal development traits evaluated by teachers.

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[2] ESL was not evaluated for all students and was excluded in this calculation.

Table 2. Prekindergarten Students who Met Expectation for Personal Development Traits, by 9-Week Period, 2010–2011

Personal development trait	Percentage of pre-K students who met expectation		Change 1st to 4th 9 weeks
	1st 9 weeks (*n* = 5,022)	4th 9 weeks (*n* = 4,986)	
Responds to questions appropriately	61	89	+28
Exhibits appropriate gross motor skills	79	97	+18
Exhibits appropriate fine motor skills	62	91	+29
Adjusts to school routines	70	94	+24
Demonstrates healthy practices	72	94	+22
Focuses on assigned tasks	62	89	+27
Works productively in large group	62	88	+26
Works productively in small group	71	92	+21
Follows directions	61	87	+26
Demonstrates self-discipline	61	85	+24
Respects the rights and property of self and others	69	90	+21
Assumes responsibility for own actions	65	89	+24
Works and plays cooperatively	73	92	+19
Solves problems appropriately	58	86	+28
Average number of traits each student met expectation	9.2	12.6	+3.4

Source. AISD student records

The personal development traits with the highest percentage of students meeting expectations at the end of the year were as follows: exhibits appropriate gross motor skills (97%), adjusts to school routines (94%), and demonstrates healthy practices (94%). The personal development traits with the greatest gains were as follows: exhibits appropriate fine motor skills (+29%), responds to questions appropriately (+28%), and solves problems appropriately (+28%). Seventy percent of pre-K students met expectation for student behavior on all 14 personal development traits by the end of the year, compared with 31% of pre-K students during the first 9-week period.

CONCLUSION

Based on the 2010–2011 academic and personal development outcomes, the AISD pre-K program achieved its goal of raising the majority of pre-K students to grade-level expectations by the end of the year, preparing them for success in kindergarten. On average, the pre-K program helped students' progress an average of 13 months in age-equivalent ability in receptive vocabulary for English speakers and 16 months for native Spanish speakers in a 7-month period. At the end of the year, only 11% of sampled pre-K students scored below the average range, down from 37% in the fall. (In a normal distribution, 15% of students are expected to be below the average range.)

AISD should continue to support funding of a full-day program for students to ensure that students continue to enter kindergarten ready to learn on grade level.

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